Atty. Docket No.: 3357-Z

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re application of

Frederick A. Parker — Examiner Ramesh Krishnamurthy

Serial No. 10/681,748 — Art Unit 3753

Filed: October 9, 2003

For: FLUID CONTROL SYSTEM FOR PRECISELY CONTROLLING A FLOW OF FLUID

APPEAL BRIEF TRANSMITTAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Attached hereto is the BRIEF ON APPEAL for the above-identified application. The fee in the amount of $250.00 is submitted herewith.

Any additional fees necessary to effect the proper and timely filing of this Brief may be charged to Deposit Account No. 26-0090.

Respectfully submitted,

Jim Zegeer

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Attachments: Brief on Appeal

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Date: October 2, 2006

In the event this paper is deemed not timely filed, the applicant hereby petitions for an appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 26-0090 along with any other additional fees which may be required with respect to this paper.

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Serial No. 10/681,748 — Art Unit 3753

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For: FLUID CONTROL SYSTEM FOR PRECISELY CONTROLLING A FLOW OF FLUID

BRIEF ON APPEAL

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an appeal from the final rejection mailed May 9, 2006 finally rejecting claims 1 - 4 and 11 - 14 of the above-identified application.

(i). The Real Party in Interest

The real party in interest is Caldyne, Inc.

(ii). Related Appeals and Interferences

There are no related appeals or interferences.

(iii). Status of the Claims

Claims 1 - 4 and 11 - 14 are on appeal. Claims 5 - 8 are drawn to a non-elected species and have been withdrawn and cancelled. Claims 9 and 10 have been cancelled.

(iv). Status of the Amendments

The amendment filed June 23, 2006 failed to place the application in condition for allowance.

(v). Summary of Claimed Subject Matter

Figure 1 is a schematic illustration of a fluid control system incorporating the invention and is reproduced below for convenience of reference:

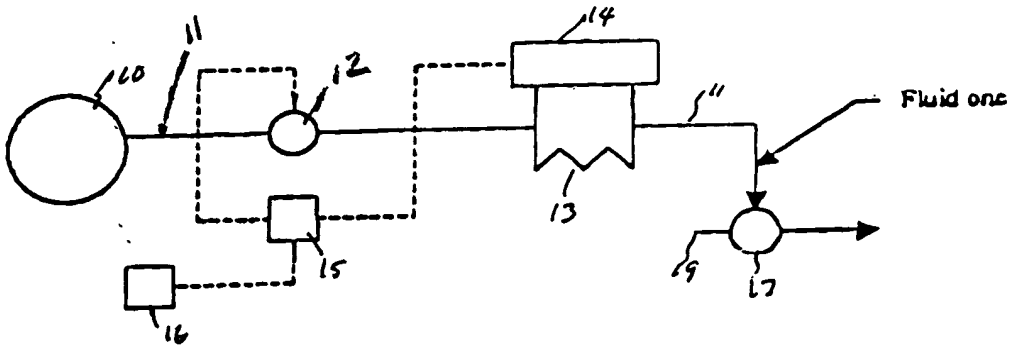


FIGURE 1

Referring to Figure 1, flow path 11 includes a flow restrictor 13 and pressure transducer 14 connected across the flow restrictor 13 for measuring the pressure differential thereacross and providing a signal proportionate to the pressure differential. This signal is supplied to a controller 15 and converted thereby to a pulsing signal to drive valve 12 "at a frequency or rate to obtain a preset target value of pressure across the flow restrictor, and thereby control the flow rate of fluid 10." (Specification, paragraph 009.)

Figure 2 illustrates the relationship between the fluid flow rate through the flow restrictor 13 and the voltage output of the pressure transducer 14. A linear relationship is shown but it can be any repeatable relationship between flow and pressure. (Specification, paragraph 009.)

In operation, if it is desired to control the flow rate of fluid 10 to the value designated by A (shown by the dotted line in Figure 2), the electronic controller 15 pulses the valve 12 at the frequency required to obtain pressure (voltage) (B) in Figure 2 across the pressure transducer. (Specification, paragraph 010.)

In compliance with 37 C.F.R. §41.37(V), the "means" clauses in the claims are identified as follows:

In claim 3, the "means for inputting a flow modifying signal to said controller or for modifying said signal due to a change in the relationship between the pressure differential across the transducer versus the flow" is shown as element 16 and described at paragraph 011 reading:

> Additional inputs may be required for certain applications. For example, if due to a significant change in temperature or pressure the fluid properties, such as that viscosity or density change appreciably, a correction or flow modifying factor can be entered into the electronic frequency controller 15 by an auxiliary input device shown in Figure 1 as component 16.

In Claim 4, the "means for inputting a flow modifying signal to said controller or for modifying the control signal due to a change in the relationship between the pressure differential across

the transducer versus the flow" is shown in component 16 and described in paragraph 011 of the specification quoted above.

There are no "means" clauses in claims 11 and 12. In claims 13 and 14, the "means for inputting a flow modifying signal to said controller or for modifying said signal due to a change in the relationship between the pressure differential across the transducer versus the flow" is component 16 and described at paragraph 011 of the specification quoted above.

(vi). Grounds of Rejection to be Reviewed on Appeal

Ground No. 1.

The rejection of claims 1 and 11 under 35 U.S.C. 102(b) as being anticipated by Balazy et al (US 6,152,162) (hereinafter Balazy).

Ground No. 2.

The rejection of claims 2 and 12 under 35 U.S.C. 103(a) as being unpatentable over Balazy et al (US 6,152,162) as applied to claims 1 and 11 further in view of Doty et al (US 2001/0032668 (hereinafter Doty).

Ground No. 3

The rejection of claims 3 and 13 under 35 U.S.C. 103(a) as being unpatentable over Balazy (US 6,152,162) as applied to claims 1 and 11 further in view of Lowery et al (US 6,564,824) (hereinafter Lowery).

Ground No. 4

The rejection of Claims 4 and 14 under 35 U.S.C. 103(a) as being unpatentable over Balazy et al (US 6,152,162) and Doty as applied to claims 2 and 12 further in view of Lowery et al (US 6,564,824).

(vii). Argument

As to Ground No. 1:

The Examiner's rejection of claims 1 and 11 as being anticipated under 35 U.S.C. 102(b) by Balazy reads as follows:

> Balazy et al discloses (See Fig. 6, for example) a fluid flow control system (400) comprising a flow path coupling a source of fluid (419); a valve (420) in said flow path, a flow restrictor (428) in said flow path, a pressure transducer (414, 416) connected across said flow restrictor for producing a control signal proportional to pressure differential there across and a controller (405) connected to receive said control signal and continuously adjust the valve (i.e. pulse said valve at a frequency) to obtain a preset target value of pressure differential across the restrictor.

In Paragraph 9 of the Final Office Action entitled "Response to Arguments," the Examiner contends:

> Applicant's arguments filed 02/22/2006 have been fully considered but they are not persuasive. Applicant's argument that Balazy does not disclose, or even suggest, a valve in the flow path that controls the flow by pulsating the valve at a controlled frequency to obtain a preset target Pressure is unpersuasive in that the claim does not recite a "pulsating the valve at a controlled frequency". Also, the limitation in claim 1 reads, "a controller connected to receive said signal and pulse said valve at a frequency to obtain a preset target valve of Pressure". Clearly the recitation "pulse said valve at a frequency" is a functional limitation and the valve in Balazy et al. is capable of meeting this functional limitation in that it is moved to achieve a target pressure. In Col. 9, lines 56 - 60, Balazy et al. clearly states that the controller (405) "continuously

> adjusts (as required)" valve (420) "to insure that the actual flow through the system precisely corresponds to that desired". Thus Balazy et al. is capable of pulsing the valve at a frequency as claimed.

Further, in the Advisory Action, the Examiner further contended that:

> Applicant's argument that Balazy et al teaches away from a control valve is unpersuasive. The 'pressure regulator' in Balazy et al is used to control flow to a desired flow rate and such regulates flow as well and thus functions as a valve. Balazy et al's statement, quoted by the applicant, concerning the use of a pressure regulator rather than a control valve is being viewed simply as a statement reflecting the use of an alternate means for achieving the desired flow control. Balazy et al does not explicitly state that a flow control valve cannot be used for the purpose of flow regulation as set forth in their invention.

Although the Examiner continues to refer to Balazy's element 420 as a "valve." Balazy characterizes it as a pressure regulator. In fact, in his Summary of the Invention, Balazy states:

> The present invention features a method and system for controlling the rate of fluid, and particularly gas, flow which uses pressure regulation rather than a control valve. (Sentence bridging columns 1 and 2 of Balazy.) (Emphasis added.)

Thus, the Examiner's mischaracterization of Balazy's pressure regulator as a control valve is erroneous. Appellant's position that Balazy does not disclose, or even suggest, a valve in the flow path that controls the flow by pulsating the valve at a controlled frequency to obtain a preset target pressure is completely accurate and fully supported by this statement from Balazy. The Balazy reference never characterizes its pressure regulator 420 as a valve. See column 8, last full paragraph reading as follows:

> Pressure regulator module 403 includes a through flow passage 423 including an inlet flow passage portion 403-i communicating at its lower end with passage 402-i of module 402 and an outlet portion 403-o at the other end of the module. A pressure regulator 420 is mounted in inlet flow passage portion 403-i, and an upstream pressure sensor 414 is provided in passage 423 downstream of pressure regulator 420. (Emphasis added.)

Again, in column 9, lines 25 and 26, Balazy refers to the pressure regulator 420 as "a signal to increase or decrease (as required) the pressure output by pressure regulator 420." Again, in the quote referred to by the Examiner, Balazy states:

> Electronics module 405, in turn, continuously monitors the input date and continuously adjusts (as required) pressure regulator 420 to insure that the actual flow through the system precisely corresponds to that desired.

All this is in keeping with Balazy's earlier disclaimer of the control valve wherein he states: "controlling the rate of fluid, and particularly gas, flow which uses pressure regulation rather than a control valve."

Even if one deems, contrary to Balazy's statement, that the pressure regulator 420 is a control valve as contended by the Examiner, there is no teaching or suggestion in Balazy or any of the secondary references of pulsing the valve at a frequency to obtain a preset target value of pressure across the flow restrictor as defined in claim 1 or, a control valve in a flow path and that the control valve being capable of high frequency pulsed operation, and a controller connected to "pulse said valve at a frequency required to obtain a preset target value of pressure across said

flow restrictor to control the flow rate of said fluid" as recited in claim 11.

Moreover, what Balazy is doing is controlling flow by controlling the pressure across a flow restrictor by adjusting one or more pressure regulators. Appellant is not. What appellant is doing is pulsating a valve and thereby producing a large number of discrete increments of fluid which, downstream of the valve, add up to give the desired flow. The more often it pulses, the more the flow. Appellant does not control the system (or downstream) pressure. If the upstream pressure is higher, each increment is larger and the valve pulses less frequently. The orifice in appellant's valve does not change size.

In Fig. 6, referred to by the Examiner, 420 is a pressure regulator, not a valve *per se*, as he states. It controls pressure, not flow. And it does it by using pressure feedback to adjust the size of a flow passage, to control pressure.

Appellant's valve directly controls the flow by having its opening frequency rate modulated by its flow measuring/electronic control system. The Examiner's interpolation of Balazy as being "capable" of performing the function "(i.e. pulse said valve at a frequency)" is entirely speculative.

Moreover, the Examiner assumes that appellant's flow restrictor and Balazy's flow restrictor to be analogous, and therefore, Balazy's pressure regulator and appellant's pulsed valve are analogous. This, of course, is not the case. Balazy controls

the flow by controlling the pressure across his restrictor. Appellant controls flow by pulsing the valve.

In appellant's system, the restrictor is not a flow controller *per se*; it is merely part of a flow measuring system providing feedback information to the electronic control module so that it can provide the proper pulsing frequency to appellant's valve. The fact that Balazy's restrictor does double duty in that it also serves as a part of the flow measuring system, which provides the flow information to his electronic controller to enable it to control the pressure across it is believed to contribute it to the Examiner's error.

As to Ground No. 2:

The rejection of claims 2 and 12 under 35 U.S.C. 103(a) as being unpatentable over Balazy as applied to claims 1 and 11, further in view of Doty is clearly in error for the reason given above. As shown above, Balazy simply does not teach the basic system so to modify Balazy by Doty does not lead to appellant's claimed invention.

As to Ground No. 3:

And the rejection of claims 3 and 13 under 35 U.S.C. 103(a) as being unpatentable over Balazy as applied to claims 1 and 11 further in view of Lowery is likewise in error. The failure of Balazy to anticipate claims 1 and 11 has been discussed extensively above and incorporated herein by reference.

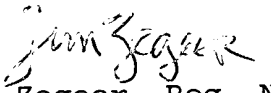
As to Ground No. 4:

The rejection of claims 4 and 14 under 35 U.S.C. 103(a) as being unpatentable over the combination of Balazy and Doty, further in view of Lowery is clearly in error. As shown extensively above, Balazy fails to disclose the basic invention claimed by appellant and the modifying of Balazy by Doty further by Lowery results in a further error on the part of the Examiner.

CONCLUSION

In conclusion, the Examiner's rejections of claims 1 - 4 and 11 - 14 are erroneous and should be reversed.

Respectfully submitted,



Jim Zegeer, Reg. No. 18,957
Attorney for Appellant

Attachment: CLAIMS APPENDIX
EVIDENCE APPENDIX

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Date: October 2, 2006

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(viii) CLAIMS APPENDIX

1. A fluid flow control system for precisely controlling fluid flow from a source of fluid under pressure,

a flow path for coupling said source of fluid to a point of utilization,

a valve in said flow path,

a flow restrictor in said flow path,

a pressure transducer connected across said flow restrictor for measuring the pressure differential thereacross and producing a signal proportional to said pressure differential, and

a controller connected to receive said signal and pulse said valve at a frequency to obtain a preset target value of pressure across said flow restrictor.

2. A system of mixing two or more fluid streams comprising in combination the fluid flow control system defined in claim 1, coupled to a mixer which is also coupled to a source of a second fluid.

3. The system defined in claim 1 including means for inputting a flow modifying signal to said controller or for modifying said signal due to a change in the relationship between the pressure differential across the transducer versus the flow.

4. The system defined in claim 2 including means for inputting a flow modifying signal to said controller or for modifying the control signal due to a change in the relationship between the pressure differential across the transducer versus the flow.

11. A fluid flow control system for precisely controlling fluid flow from a source of fluid under pressure,

a flow path for coupling said source of fluid to a point of utilization,

a control valve in said flow path, said control valve being capable of high frequency pulsed operation,

a flow restrictor in said flow path,

a pressure transducer connected across said flow restrictor for measuring the pressure differential thereacross and producing a voltage signal proportional to said pressure differential, and

a controller connected to convert said voltage signal and pulse said valve at a frequency required to obtain a preset target value of pressure across said flow restrictor to control the flow rate of said fluid.

12. A system of mixing two or more fluid streams comprising in combination the fluid flow control system defined in claim 11, coupled to a mixer which is also coupled to a source of a second fluid.

13. The system defined in claim 11 including means for inputting a flow modifying signal to said controller or for modifying said signal due to a change in the relationship between the pressure differential across the transducer versus the flow.

14. The system defined in claim 11 including means for inputting a flow modifying signal to said controller for modifying the control signal due to a change in the relationship between the pressure differential across the transducer versus the flow.

(ix). EVIDENCE APPENDIX

None.

(x). RELATED PROCEEDINGS APPENDIX

There are no proceedings as mentioned in section (i) above, and accordingly no decisions rendered.